Water Quality Assessment
Uncompahgre River
City of Montrose and West Montrose Sanitation District

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I. Water Quality Assessment Summary

Table A-1 includes summary information related to this WQA. This summary table includes key regulatory starting points used in development of the WQA such as: receiving stream information; threatened and endangered species; 303(d) and Monitoring and Evaluation listings; low flow and facility flow summaries; and a list of parameters evaluated.

Table A-1
WQA Summary

Facility Information			
Facility Name	**Permit Number**	**Design Flow (max 30-day ave, MGD)**	**Design Flow (max 30-day ave, CFS)**
F1. City of Montrose WWTF	CO0039624	4.32	6.7
F2. West Montrose Sanitation District	CO0030449	0.7	1.1

Receiving Stream Information			
Receiving Stream Name	**Segment ID**	**Designation**	**Classification(s)**
Uncompahgre River	COGUUN04a	Undesignated	Aquatic Life Warm 1 Recreation Class E Agriculture Water Supply

Low Flows (cfs)			
1E3 (1-day)	**7E3 (7-day)**	**30E3 (30-day)**	**Ratio of 30E3 to the Design Flow (cfs)**
30	30	34	F1: 5:1 F2: 31:1

Regulatory Information					
T&E Species	**303(d) (Reg 93)**	**Monitor and Eval (Reg 93)**	**Existing TMDL**	**Temporary Modification(s)**	**Control Regulation**
No	None	Sediment	Yes Selenium 02/14/11	None	Reg 39 Salinity Regulations

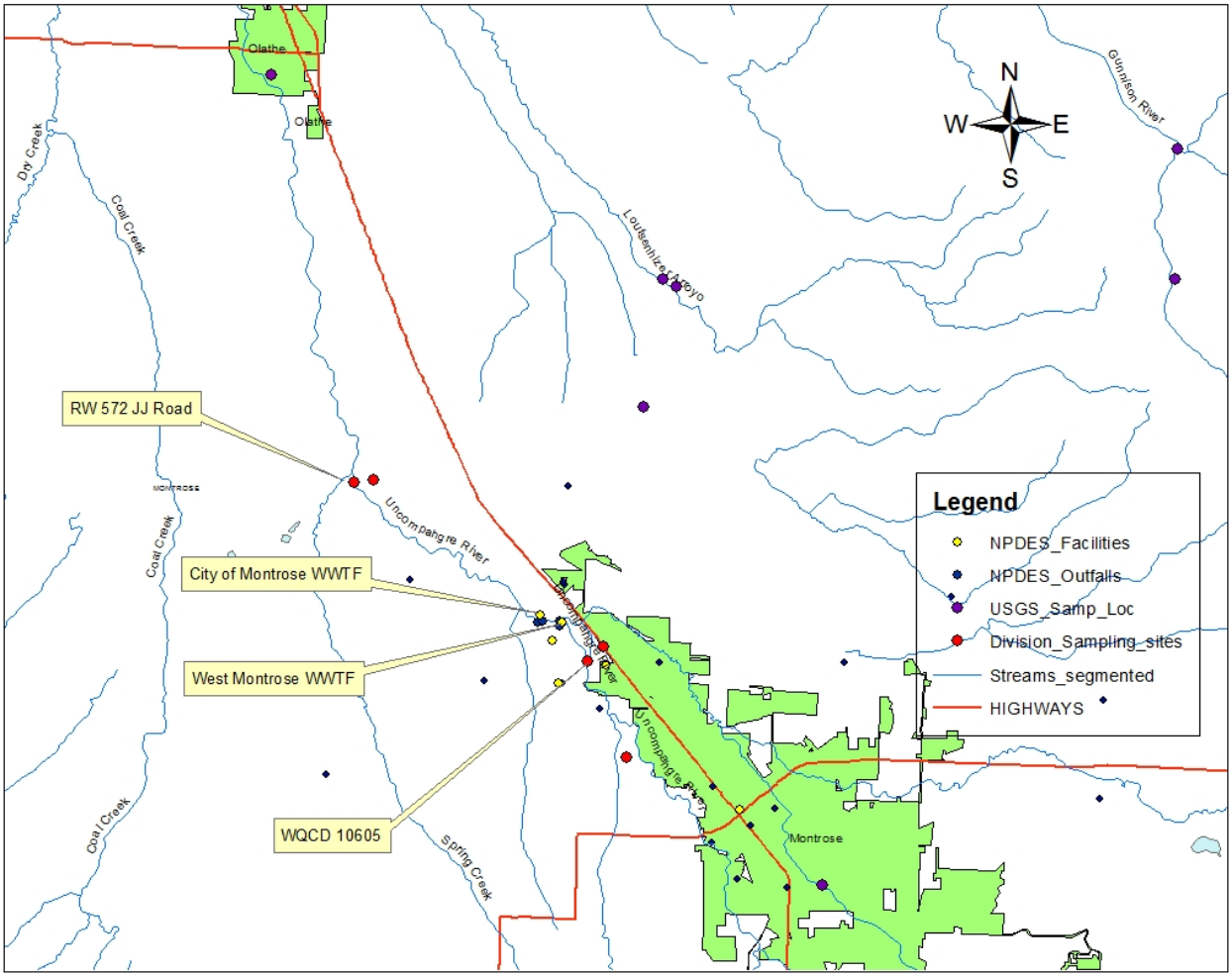
Pollutants Evaluated
F1: Ammonia, *E. Coli*, TRC, Nitrate/Nitrite, Metals, Cyanide, Temp, Nonylphenol and pH
F2: Ammonia, *E. Coli*, TRC, Nitrate/Nitrite, Selenium (due to TMDL), Temp and pH

II. Introduction

The water quality assessment (WQA) of Uncompahgre River near the City of Montrose Wastewater Treatment Facility (Montrose WWTF) and West Montrose Sanitation District Wastewater Treatment Facility (Montrose SD WWTF), located in Montrose County, is intended to determine the assimilative capacities available for pollutants found to be of concern. This WQA describes how the

water quality based effluent limits (WQBELs) are developed. These parameters may or may not appear in the permit with limitations or monitoring requirements, subject to other determinations such as reasonable potential analysis, evaluation of federal effluent limitation guidelines, implementation of state-based technology based limits, mixing zone analyses, 303(d) listings, threatened and endangered species listing, or other requirements as discussed in the permit factsheet. Figure A-1 contains a map of the study area evaluated as part of this WQA.

FIGURE A-1



The City of Montrose WWTF and West Montrose Sanitation District WWTF both discharge to the Uncompahgre River, which is stream segment COGUUN04a. This means the Gunnison River Basin, Uncompahgre River Sub-basin, Stream Segment 04a. This segment is composed of the "Mainstem of the Uncompahgre River from the Highway 90 bridge at Montrose to Gunnison Road." Stream segment COGUUN04a is classified for Aquatic Life Warm 1, Recreation Class E, Water Supply and Agriculture.

The West Montrose Sanitation District WWTF discharges approximately 0.3 miles upstream from the Montrose WWTF's discharge location. Due to their proximity, the two facilities will be modeled

together determining available assimilative capacities for all parameters of concern in common. These parameters are selenium, *E. coli*, total residual chlorine and ammonia.

A TMDL was developed and approved for stream segment COGUUN04b (Uncompahgre River from LaSalle Road to Confluence Park), which included the Town of Olathe WWTF, Montrose WWTF and the West Montrose SD WWTF. Although the stream segment into which the Montrose WWTF and the West Montrose SD WWTF discharges has changed from COGUUN04b to COGUUN04a, the TMDL included waste load allocations for the Montrose WWTF and the West Montrose SD WWTF and will be implemented in the new permits.

Information used in this assessment includes data gathered from the City of Montrose and the West Montrose Sanitation District, the Division, the Colorado Division of Water Resources (DWR), Riverwatch, the U.S. Environmental Protection Agency (EPA), the U.S. Geological Survey (USGS), and communications with the local water commissioner. The data used in the assessment consist of the best information available at the time of preparation of this WQA analysis.

III. Water Quality Standards

Narrative Standards

Narrative Statewide Basic Standards have been developed in Section 31.11(1) of the regulations, and apply to any pollutant of concern, even where there is no numeric standard for that pollutant. Waters of the state shall be free from substances attributable to human-caused point source or nonpoint source discharges in amounts, concentrations or combinations which:

for all surface waters except wetlands;

(i) can settle to form bottom deposits detrimental to the beneficial uses. Depositions are stream bottom buildup of materials which include but are not limited to anaerobic sludge, mine slurry or tailings, silt, or mud; or (ii) form floating debris, scum, or other surface materials sufficient to harm existing beneficial uses; or (iii) produce color, odor, or other conditions in such a degree as to create a nuisance or harm existing beneficial uses or impart any undesirable taste to significant edible aquatic species or to the water; or (iv) are harmful to the beneficial uses or toxic to humans, animals, plants, or aquatic life; or (v) produce a predominance of undesirable aquatic life; or (vi) cause a film on the surface or produce a deposit on shorelines; and

for surface waters in wetlands;

(i) produce color, odor, changes in pH, or other conditions in such a degree as to create a nuisance or harm water quality dependent functions or impart any undesirable taste to significant edible aquatic species of the wetland; or (ii) are toxic to humans, animals, plants, or aquatic life of the wetland.

In order to protect the Basic Standards in waters of the state, effluent limitations and/or monitoring requirements for any parameter of concern could be put in CDPS discharge permits.

Standards for Organic Parameters and Radionuclides

Radionuclides: Statewide Basic Standards have been developed in Section 31.11(2) and (3) of The Basic Standards and Methodologies for Surface Water to protect the waters of the state from radionuclides and organic chemicals.

In no case shall radioactive materials in surface waters be increased by any cause attributable to municipal, industrial, or agricultural practices or discharges to as to exceed the following levels, unless alternative site-specific standards have been adopted. Standards for radionuclides are shown in Table A-2.

Table A-2
Radionuclide Standards

Parameter	Picocuries per Liter
Americium 241*	0.15
Cesium 134	80
Plutonium 239, and 240*	0.15
Radium 226 and 228*	5
Strontium 90*	8
Thorium 230 and 232*	60
Tritium	20,000

*Radionuclide samples for these materials should be analyzed using unfiltered (total) samples. These Human Health based standards are 30-day average values for both plutonium and americium.

Organics: The organic pollutant standards contained in the Basic Standards for Organic Chemicals Table are applicable to all surface waters of the state for the corresponding use classifications, unless alternative site-specific standards have been adopted. These standards have been adopted as "interim standards" and will remain in effect until alternative permanent standards are adopted by the Commission. These interim standards shall not be considered final or permanent standards subject to antibacksliding or downgrading restrictions. Although not reproduced in this WQA, the specific standards for organic chemicals can be found in Regulation 31.11(3).

In order to protect the Basic Standards in waters of the state, effluent limitations and/or monitoring requirements for radionuclides, organics, or any other parameter of concern could be put in CDPS discharge permits.

The aquatic life standards for organics apply to all stream segments that are classified for aquatic life. The water supply standards apply only to those segments that are classified for water supply. The water + fish standards apply to those segments that have a Class 1 aquatic life and a water supply classification. The fish ingestion standards apply to Class 1 aquatic life segments that do not have a water supply designation. The water + fish and the fish ingestion standards may also apply to Class 2 aquatic life segments, where the Water Quality Control Commission has made such determination.

Because the Uncompahgre River is classified for Aquatic Life Warm 1, with a water supply designation, the water supply, water + fish, and aquatic life standards apply to this discharge.

Salinity

Regulation 61.8(2)(l) contains requirements regarding salinity for any discharges to the Colorado River Watershed. For industrial dischargers and for the discharge of intercepted groundwater, this is a no-salt discharge requirement. However, the regulation states that this requirement may be waived where the salt load reaching the mainstem of the Colorado River is less than 1 ton per day, or less than 350 tons per year. The Division may permit the discharge of salt upon a satisfactory demonstration that it is not practicable to prevent the discharge of all salt. See Regulation 61.8(2)(l)(i)(A)(1) for industrial discharges and 61.8(2)(l)(iii) for discharges of intercepted groundwater for more information regarding this demonstration.

For municipal dischargers, an incremental increase of 400 mg/l above the flow weighted averaged salinity of the intake water supply is allowed. This may be waived where the salt load reaching the mainstem of the Colorado River is less than 1 ton per day, or less than 366 tons per year. The Division may permit the discharge of salt in excess of the 400 mg/l incremental increase, upon a satisfactory demonstration that it is not practicable to attain this limit. See Regulation 61.8(2)(l)(vi)(A)(1) for more information regarding this demonstration.

In addition, the Division's policy, Implementing Narrative Standards in Discharge Permits for the Protection of Irrigated Crops, may be applied to discharges where an agricultural water intake exists downstream of a discharge point. Limitations for electrical conductivity and sodium absorption ratio may be applied in accordance with this policy.

Temperature

Temperature shall maintain a normal pattern of diurnal and seasonal fluctuations with no abrupt changes and shall have no increase in temperature of a magnitude, rate, and duration deemed deleterious to the resident aquatic life. This standard shall not be interpreted or applied in a manner inconsistent with section 25-8-104, C.R.S.

Segment Specific Numeric Standards

Numeric standards are developed on a basin-specific basis and are adopted for particular stream segments by the Water Quality Control Commission. The standards in Table A-3a have been assigned to stream segment COGUUN04a in accordance with the *Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins*. Additionally, the parameters in Table A-3b are also being evaluated as they are parameters of concern for this facility type. These parameters are being included based on the numeric standards in Regulation 31.

Note that an amendment to the *Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins* became effective on March 30, 2013. This action modifies the classifications for this segment to include water supply standards and changed the antidegradation designation from

Use Protected to none (Reviewable). The following standards were revised or added to reflect the new Water Supply use: nitrate 10 mg/L, chloride 250 mg/L, sulfate WS, chronic total recoverable arsenic 0.02 ug/L, acute total recoverable chromium III 50 ug/L, chronic dissolved iron WS, and chronic dissolved manganese WS. The Aquatic Life use classification was upgraded from Warm 2 to Warm 1. The segment was changed from "the Mainstem of the Uncompahgre River from Highway 90 Bridge at Montrose to La Salle Road" to "the Mainstem of the Uncompahgre River from the Highway 90 Bridge at Montrose to the Gunnison Road" thereby extending the segment to include the Montrose WWTF and the West Montrose SD WWTF. Additional changes include temperature standards, update to the zinc table values, and addition of a chronic molybdenum standard to bring this segment up to date with Regulation 31, which was revised in 2007 and 2010.

Table A-3a In-stream Standards for Stream Segment COGUUN04a
Physical and Biological
Dissolved Oxygen (DO) = 5 mg/l, minimum
pH = 6.5 - 9 su
E. coli chronic = 126 colonies/100 ml
Temperature March-Nov = 27.5° C MWAT and 28.6° C DM
Temperature Dec-Feb = 13.8° C MWAT and 14.3° C DM
Inorganic
Total Ammonia acute and chronic = TVS
Chlorine acute = 0.019 mg/l
Chlorine chronic = 0.011 mg/l
Free Cyanide acute = 0.005 mg/l
Sulfide chronic = 0.002 mg/l
Boron chronic = 0.75 mg/l
Nitrite acute = 0.5 mg/l
Nitrate acute = 10 mg/l
Chloride chronic = 250 mg/l
Sulfate chronic = For WS, the greater of ambient water quality as of January 1, 2000 or 250 mg/l
Metals
Dissolved Arsenic acute = 340 µg/l
Total Recoverable Arsenic chronic = 0.02 µg/l
Dissolved Cadmium acute and chronic = TVS
Total Recoverable Trivalent Chromium acute = 50 µg/l
Dissolved Trivalent Chromium chronic = TVS
Dissolved Hexavalent Chromium acute and chronic = TVS
Dissolved Copper acute and chronic = TVS
Dissolved Iron chronic = For WS, the greater of ambient water quality as of January 1, 2000, or 300 µg/l
Total Recoverable Iron chronic = 1000 µg/l
Dissolved Lead acute and chronic = TVS
Dissolved Manganese chronic = For WS, the greater of ambient water quality as of January 1, 2000, or 50 µg/l
Dissolved Manganese acute and chronic = TVS
Total Recoverable Molybdenum chronic = 160 µg/l
Total Mercury chronic = 0.01 µg/l
Dissolved Nickel acute and chronic = TVS
Dissolved Selenium acute and chronic = TVS
Dissolved Silver acute and chronic = TVS
Dissolved Zinc acute and chronic = TVS

Table A-3b Additional Standards Being Evaluated Based on Regulation 31
Nonylphenol acute = 28 µg/l
Nonylphenol chronic = 6.6 µg/l

Table Value Standards and Hardness Calculations

Standards for metals are generally shown in the regulations as Table Value Standards (TVS), and these often must be derived from equations that depend on the receiving stream hardness or species of fish present; for ammonia, standards are discussed further in Section IV of this WQA. The Classification and Numeric Standards documents for each basin include a specification for appropriate hardness values to be used. Specifically, the regulations state that:

> The hardness values used in calculating the appropriate metal standard should be based on the lower 95% confidence limit of the mean hardness value at the periodic low flow criteria as determined from a regression analysis of site-specific data. Where insufficient site-specific data exists to define the mean hardness value at the periodic low flow criteria, representative regional data shall be used to perform the regression analysis. Where a regression analysis is not appropriate, a site-specific method should be used.

Hardness data for Uncompahgre River near the point of discharge of the Montrose WWTF and West Montrose SD WWTF were insufficient to conduct a regression analysis based on the low flow. Therefore, the Division's alternative approach to calculating hardness was used, which involves computing a mean hardness.

The mean hardness was computed to be 383 mg/l based on sampling data from Riverwatch Station 572 (Uncompahgre River at JJ Road) located on Uncompahgre River 3½ mile downstream from the Montrose WWTF. Data from this location were available for a period of record from February 1997 through May 2001. This hardness value and the formulas contained in the TVS were used to calculate the in-stream water quality standards for metals, with the results shown in Table A-4.

Table A-4

TVS-Based Metals Water Quality Standards for CO0039624

Based on the Table Value Standards Contained in the Colorado Department of Public Health and Environment Water Quality Control Commission *Regulation 35*

Parameter	***In-Stream Water Quality Standard***			***TVS Formula: Hardness (mg/l) as CaCO3 =*** **383**
Cadmium, Dissolved	Acute	8.8	µg/l	$[1.136672-0.041838\ln(\text{hardness})]e^{(0.9151(\ln(\text{hardness}))-3.1485)}$
	Chronic	1.2	µg/l	$[1.101672-0.041838\ln(\text{hardness})]e^{(0.7998(\ln(\text{hardness}))-4.4451)}$
Trivalent Chromium, Dissolved	Chronic	223	µg/l	$e^{(0.819(\ln(\text{hardness}))+0.5340)}$
Hexavalent Chromium, Dissolved	Acute	16	µg/l	Numeric standards provided, formula not applicable
	Chronic	11	µg/l	Numeric standards provided, formula not applicable
Copper, Dissolved	Acute	48	µg/l	$e^{(0.9422(\ln(\text{hardness}))-1.7408)}$
	Chronic	28	µg/l	$e^{(0.8545(\ln(\text{hardness}))-1.7428)}$
Lead, Dissolved	Acute	269	µg/l	$[1.46203-0.145712\ln(\text{hardness})][e^{(1.273(\ln(\text{hardness}))-1.46)}]$
	Chronic	10	µg/l	$[1.46203-0.145712\ln(\text{hardness})][e^{(1.273(\ln(\text{hardness}))-4.705)}]$
Manganese, Dissolved	Acute	4670	µg/l	$e^{(0.3331(\ln(\text{hardness}))+6.4676)}$
Nickel, Dissolved	Acute	1458	µg/l	$e^{(0.846(\ln(\text{hardness}))+2.253)}$
	Chronic	162	µg/l	$e^{(0.846(\ln(\text{hardness}))+0.0554)}$
Selenium, Dissolved	Acute	18.4	µg/l	Numeric standards provided, formula not applicable
	Chronic	4.6	µg/l	Numeric standards provided, formula not applicable
Silver, Dissolved	Acute	20	µg/l	$½\ e^{(1.72(\ln(\text{hardness}))-6.52)}$
	Chronic	3.2	µg/l	$e^{(1.72(\ln(\text{hardness}))-9.06)}$
Zinc, Dissolved	Acute	543	µg/l	$0.978e^{(0.9094(\ln(\text{hardness}))+0.9095)}$
	Chronic	411	µg/l	$0.9094e^{(0.9094(\ln(\text{hardness}))+0.6235)}$

Total Maximum Daily Loads and Regulation 93 – Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List

This stream segment is listed for monitoring and evaluation for Sediment. According to Division standard procedure, the Division's Environmental Data Unit investigates issues of water quality standard exceedances. If it is determined that the water body is impaired, the segment will be added to the 303(d) list. At a minimum, the permit may contain monitoring requirements to support a future TMDL if the segment is listed.

The Division's Restoration and Protection Unit have completed the TMDL for selenium; therefore the requirements of the TMDL apply for selenium. The WLAs in the TMDL were combined for the

Town of Olathe WWTF, the Montrose WWTF and the West Montrose SD WWTF as 0.361 lbs/day for chronic selenium. The WLA for individual facilities based on Division records are shown in Table A-5.

Table A-5
TMDL Waste Load Allocations for Selenium

Facility	WLA (lbs/day)
Town of Olathe WWTF (for 2nd tier design flow of 0.49 MGD (0.76 cfs))	**0.021**
West Montrose SD WWTF (at design flow of 0.7 MGD)	**0.048**
City of Montrose WWTF (at design flow of 4.32 MGD)	**0.29**

IV. Receiving Stream Information

Low Flow Analysis

The Colorado Regulations specify the use of low flow conditions when establishing water quality based effluent limitations, specifically the acute and chronic low flows. The acute low flow, referred to as 1E3, represents the one-day low flow recurring in a three-year interval, and is used in developing limitations based on an acute standard. The 7-day average low flow, 7E3, represents the seven-day average low flow recurring in a 3 year interval, and is used in developing limitations based on a Maximum Weekly Average Temperature standard (MWAT). The chronic low flow, 30E3, represents the 30-day average low flow recurring in a three-year interval, and is used in developing limitations based on a chronic standard.

To determine the low flows available to the Montrose WWTF and West Montrose SD WWTF, a flow gauge measurement immediately upstream of the facilities should be used. There are no gauge stations immediately upstream of the Montrose and West Montrose SD WWTFs, and there are several gauged and ungauged diversions between the nearest gauge station and the WWTFs. Low flows for the 2009 WQA for Montrose and West Montrose were determined using flow data from the AB Lateral diversion ditch, the Selig Canal and daily flows from the USGS Gauge Station 09147500 (Uncompahgre River at Colona, CO), located approximately 15 miles upstream from the wastewater treatment facilities, based on recommendation from the water commissioner. Recent discussion with the water commissioner confirm that determining the low flow for this section of the river is still a complex issue; however, the commissioner suggested that the UBCBRGCO gauge station (Uncompahgre River at Uncompahgre Road Bridge), installed in May 2011, located approximately 12 miles upstream of the facilities, would provide a more accurate result than USGS Gauge Station 09147500. The only available data for the UBCBRGCO gauge station at this time, is from May 2011 through September 2011. The flow data from UBCBRGCO is insufficient to determine low flow at this time. Due to the complexities of the gauged and ungauged flows on the river and the likelihood that the low flow will not have changed significantly, the flow result from the March 2009 WQA for the Montrose WWTF and West Montrose SD WWTF will be used for this WQA, until there is sufficient data from UBCBRGCO or from a gauge immediately upstream of the facilities. The 2009 low flow was determined by using the maximum of the daily flows between the USGS Gauge Station less Selig Canal, and the AB Lateral. According to the 2009 WQA, data during certain seasonal transitions were deleted due to factors of implausibility.

Based on the low flow analysis described above, the upstream low flows available to the Montrose WWTF and West Montrose SD WWTF were calculated and are presented in Table A-6.

Table A-6
Low Flows for Uncompahgre River at the Montrose WWTF

Low Flow (cfs)	*Annual*	*Jan*	*Feb*	*Mar*	*Apr*	*May*	*Jun*	*Jul*	*Aug*	*Sep*	*Oct*	*Nov*	*Dec*
1E3 Acute	30	30	30	30	41	60	127	110	65	61	38	35	33
7E3 Chronic	30	30	30	30	44	60	132	110	66	63	38	35	33
30E3 Chronic	34	34	34	34	44	62	140	110	67	67	40	35	34

The 1E3 flow for the months of January, March and May were higher than the 7E3 and were therefore set equal to the 7E3 low flows.

The ratio of the low flow of Uncompahgre River to the Montrose WWTF design flow is 5:1.

The ratio of the low flow of Uncompahgre River to the West Montrose SD WWTF design flow is 31:1.

Mixing Zones

The amount of the available assimilative capacity (dilution) that may be used by the permittee for the purposes of calculating the WQBELs may be limited in a permitting action based upon a mixing zone analysis or other factor. These other factors that may reduce the amount of assimilative capacity available in a permit are: presence of other dischargers in the vicinity; the presence of a water diversion downstream of the discharge (in the mixing zone); the need to provide a zone of passage for aquatic life; the likelihood of bioaccumulation of toxins in fish or wildlife; habitat considerations such as fish spawning or nursery areas; the presence of threatened and endangered species; potential for human exposure through drinking water or recreation; the possibility that aquatic life will be attracted to the effluent plume; the potential for adverse effects on groundwater; and the toxicity or persistence of the substance discharged.

Unless a facility has performed a mixing zone study during the course of the previous permit, and a decision has been made regarding the amount of the assimilative capacity that can be used by the facility, the Division assumes that the full assimilative capacity can be allocated. Note that the review of mixing study considerations, exemptions and perhaps performing a new mixing study (due to changes in low flow, change in facility design flow, channel geomorphology or other reason) is evaluated in every permit and permit renewal.

If a mixing zone study has been performed and a decision regarding the amount of available assimilative capacity has been made, the Division may calculate the water quality based effluent

limitations (WQBELs) based on this available capacity. In addition, the amount of assimilative capacity may be reduced by T&E implications.

For Montrose WWTF and West Montrose SD WWTF, 100% of the available assimilative capacity may be used as the West Montrose SD WWTF was excluded from the mixing zone regulations based on extreme mixing ratios and the second threshold test excluded the Montrose WWTF from the mixing zone regulations. Also, the discharge from these facilities is not to a T&E stream segment, and is not expected to have an influence on any of the other factors listed above.

Ambient Water Quality

The Division evaluates ambient water quality based on a variety of statistical methods as prescribed in Section 31.8(2)(a)(i) and 31.8(2)(b)(i)(B) of the *Colorado Department of Public Health and Environment Water Quality Control Commission Regulation No. 31*, and as outlined in the Division's Policy for Characterizing Ambient Water Quality for Use in Determining Water Quality Standards Based Effluent Limits (WQP-19). Ambient water quality is evaluated in this WQA analysis for use in determining assimilative capacities and in completing antidegradation reviews for pollutants of concern, where applicable.

To conduct an assessment of the ambient water quality upstream of the Montrose WWTF and West Montrose SD WWTF, data were gathered from WQCD Station 10605, located approximately ½ mile upstream of the West Montrose SD WWTF's discharge location. Data were available for a period of record from 1998 through 2005. A summary of the upstream data from this source is presented in Table A-7.

Table A-7

Ambient Water Quality for Uncompahgre River

Parameter	*Number of Samples*	*15th Percentile*	*50th Percentile*	*85th Percentile*	*Mean*	*Maximum*	*Chronic Stream Standard*	*Notes*
Temp (°C)	12	5.2	13	17	11	19	NA	
DO (mg/l)	12	8.9	11	12	10	13	5	
pH (su)	12	8.2	8.5	8.7	8.4	8.9	6.5-9	
E. coli (#/100 ml)	9	1	36	88	15	140	126	1
Nitrate+Nitrite as N (mg/l)	12	0	0.18	0.53	0.23	0.68	NA	2
Total Inorganic Nitrogen (mg/l)	12	0.037	0.18	0.58	0.26	0.68	10	
NH_3 as N, Tot (mg/l)	12	0	0.015	0.06	0.026	0.07	TVS	2
Cd, Dis (µg/l)	12	0	0	0	0	0	1.20	2
Cu, Dis (µg/l)	12	0	0	0	0.58	7	28	2
Fe, Dis (µg/l)	12	0	0	16	7.3	28	300	2
Fe, TR (µg/l)	12	85	190	464	278	920	1000	
Pb, Dis (µg/l)	12	0	0	0	0	0	10.00	2
Mn, Dis (µg/l)	12	0	14	23	13	31	50	2
Se, Dis (µg/l)	12	0	1.3	2.5	1.2	4.0	4.6	2
Zn, Dis (µg/l)	12	0	0	5.2	3.3	25	411	2
Hardness as $CaCO_3$ (mg/l)	56	256	346	512	383	700	NA	3

Note 1: The calculated mean is the geometric mean. Note that for summarization purposes, the value of one was used where there was no detectable amount because the geometric mean cannot be calculated using a value equal to zero.

Note 2: When sample results were below detection levels, the value of zero was used in accordance with the Division's standard approach for summarization and averaging purposes.

Note 3: data for hardness were collected downstream of the WWTFs, at Riverwatch Station 572 (Uncompahgre River at JJ Road).

V. Facility Information and Pollutants Evaluated

Facility Information

The Montrose WWTF is located in the SW1/4, NE1/4, S18, T49N, R9W; 3315 N. Townsend Avenue, Montrose, CO 81401; 38.510° latitude North and 107.921° longitude West in Montrose County. The current design capacity of the facility is 4.32 MGD (6.7 cfs).

The West Montrose SD WWTF is located in the E1/2, SE1/4, S18, T49N, R9W; 62627 LaSalle Rd., Montrose, CO 81403; 38° 30' 37" latitude North and 107° 54' 59" longitude West. The current design capacity of the facility is 0.7 MGD (1.1 cfs).

Wastewater treatment at both facilities is accomplished using a mechanical wastewater treatment process. The technical analyses that follow include assessments of the assimilative capacity based on this design capacity.

An assessment of Division records indicate that there are 3 facilities with individual permit discharging to the same stream segment or other stream segments immediately upstream or downstream from this facility. Other facilities discharging to the same stream segment or other stream segments immediately upstream or downstream from this facility are covered by general permits and have limitations set at the water quality standards. These facilities were not modeled in this WQA as they have a minimal impact on the ambient water quality. The nearest discharger is:

- The Town of Olathe WWTF (CO0020907), discharging into stream segment COGUUN04b, approximately 10 miles downstream of the Montrose WWTF and West Montrose SD WWTF.

Due to the distance between facilities, and the change in stream characteristic, the Town of Olathe WWTF was not model together with the Montrose WWTF and West Montrose SD WWTF when determining the available assimilative capacities in Uncompahgre River for the Montrose WWTF and West Montrose SD WWTF.

Pollutants of Concern

Pollutants of concern may be determined by one or more of the following: facility type; effluent characteristics and chemistry; effluent water quality data; receiving water quality; presence of federal effluent limitation guidelines; or other information. Parameters evaluated in this WQA may or may not appear in a permit with limitations or monitoring requirements, subject to other determinations such as a reasonable potential analysis, mixing zone analyses, 303(d) listings, threatened and endangered species listings or other requirement as discussed in a permit rationale.

There are no site-specific in-stream water quality standards for BOD_5 or $CBOD_5$, TSS, percent removal, and oil and grease for this receiving stream. Thus, assimilative capacities were not determined for these parameters. The applicable limitations for these pollutants can be found in Regulation No. 62 and will be applied in the permit for the WWTF.

The following parameters were identified by the Division as pollutants to be evaluated for this facility:

- Total Residual Chlorine
- *E. coli*
- Nitrate/Nitrite
- Ammonia
- Temperature
- Metals and Cyanide (Montrose WWTF only)
- Selenium (Montrose WWTF and West Montrose SD WWTF due to TMDL)
- Nonylphenol (Montrose WWTF only)

- Sulfate and chloride (Montrose WWTF only)

Based upon the size of the discharge, the lack of industrial contributors, dilution provided by the receiving stream and the fact that no unusually high metals concentrations are expected to be found in the wastewater effluent, metals, except for selenium, are not evaluated further in this water quality assessment for the West Montrose SD WWTF.

It is the Division's standard procedure to consider metals and cyanide as potential pollutants of concern for all major domestic WWTFs.

According to the *Rationale for Classifications, Standards and Designations of the Gunnison River*, stream segment COGUUN04a is designated a water supply because there are several alluvial wells located in this segment. A private domestic well is on the alluvium approximately 8 miles downstream of the discharge. Thus, the nitrate standard, which is applied at the point of intake to a water supply, is further evaluated as part of this WQA. Also, chronic dissolved manganese, sulfate, chloride and dissolved iron, which are for water supply, are also evaluated for the Montrose WWTF.

During assessment of the facility, nearby facilities, and receiving stream water quality, no additional parameters were identified as pollutants of concern.

VI. Determination of Water Quality Based Effluent Limitations (WQBELs)

Technical Information

Note that the WQBELs developed in the following paragraphs, are calculations of what an effluent limitation may be in a permit. The WQBELs for any given parameter, will be compared to other potential limitations (federal effluent limitations guidelines, state effluent limitations, or other applicable limitation) and typically the more stringent limit is incorporated into a permit. If the WQBEL is the more stringent limitation, incorporation into a permit is dependent upon a reasonable potential analysis.

In-stream background data and low flows evaluated in Sections II and III are used to determine the assimilative capacity of Uncompahgre River near the Montrose WWTF for pollutants of concern, and to calculate the WQBELs. For all parameters except ammonia, it is the Division's approach to calculate the WQBELs using the lowest of the monthly low flows (referred to as the annual low flow) as determined in the low flow analysis. For ammonia, it is the standard procedure of the Division to determine monthly WQBELs using the monthly low flows, as the regulations allow the use of seasonal flows.

The Division's standard analysis consists of steady-state, mass-balance calculations for most pollutants and modeling for pollutants such as ammonia. The mass-balance equation is used by the Division to calculate the WQBELs, and accounts for the upstream concentration of a pollutant at the existing quality, critical low flow (minimal dilution), effluent flow and the water quality standard. The mass-balance equation is expressed as:

$$M_2 = \frac{M_3 Q_3 - M_1 Q_1}{Q_2}$$

Where,

Q_1 = Upstream low flow (1E3 or 30E3)
Q_2 = Average daily effluent flow (design capacity)
Q_3 = Downstream flow ($Q_1 + Q_2$)
M_1 = In-stream background pollutant concentrations at the existing quality
M_2 = Calculated WQBEL
M_3 = Water Quality Standard, or other maximum allowable pollutant concentration

The upstream background pollutant concentrations used in the mass-balance equation will vary based on the regulatory definition of existing ambient water quality. For most pollutants, existing quality is determined to be the 85th percentile. For metals in the total or total recoverable form, existing quality is determined to be the 50th percentile. For pathogens such as fecal coliform and *E. coli*, existing quality is determined to be the geometric mean.

For temperature, the highest 7-day mean (for the chronic standard) of daily average stream temperature, over a seven consecutive day period will be used in calculations of the chronic temperature assimilative capacity, where the daily average temperature should be calculated from a minimum of three measurements spaced equally through the day. The highest 2-hour mean (for the acute standard) of stream temperature will be used in calculations of the acute temperature assimilative capacity. The highest 2-hour mean should be calculated from a minimum of 12 measurements spaced equally through the day.

Because the two facilities are in close proximity, they must be modeled together for shared parameters of concern. When facilities are modeled together, the design flow, Q_2, reflects the combined design flow of the facilities modeled together for a particular parameter, thereby resulting in the calculation of the WQBELs, M_2, applicable to the modeled facilities as set forth below. Because the Montrose and West Montrose SD WWTF's are designed to treat for ammonia, they will be modeled together for ammonia in the AMMTOX model. Because metals are not pollutants of concern for the West Montrose SD WWTF, metals will be analyzed separately for the Montrose WWTF. Because the two facilities are less than a mile apart, they will be modeled together for nitrate, nitrite, *E coli* and chlorine.

Calculation of WQBELs

Using the mass-balance equation provided in the beginning of Section VI, the acute and chronic low flows set out in Section IV, ambient water quality as discussed in Section IV, and the in-stream standards shown in Section III, the WQBELs for were calculated. The data used and the resulting WQBELs, M_2, are set forth in Tables A-8a and A-8b for the chronic and acute WQBELs for the Montrose WWTF and Tables A-8c and A-8d for the chronic and acute WQBELs for the West Montrose WWTF.

Chlorine: Because chlorine is rapidly oxidized, in-stream levels of residual chlorine are detected only for a short distance below a source. Ambient chlorine was therefore assumed to be zero.

***E. coli*:** For *E. coli*, the Division establishes the 7-day geometric mean limit as two times the 30-day geometric mean limit and also includes maximum limits of 2,000 colonies per 100 ml (30-day geometric mean) and 4,000 colonies per 100 ml (7-day geometric mean). This 2000 colony limitation also applies to discharges to ditches.

Temperature:

West Montrose SD WWTF
The 7E3 low flow is 30, resulting in a dilution ratio (7E3 low flow to effluent) of 27:1. As the discharge is from a Domestic WWTF where the available dilution ratio is > 10:1, in accordance with the Division's Temperature Policy, no temperature limitations are required.

Montrose WWTF
A WQBEL for temperature can only be calculated if there is representative data, in the proper form, to determine what the background Maximum Weekly Average Temperature and Daily Maximum ambient temperatures are. As this data is not available at this time, the temperature limitation will be set at the water quality standard and will be revisited in the future when representative temperature data becomes available.

Nitrate / Total Inorganic Nitrogen (T.I.N.): An acute nitrate standard of 10 mg/l is assigned to this segment, and is intended to be applied at the nearest downstream water intake, which is located approximately eight miles downstream from the Montrose WWTF and the West Montrose SD WWTF. Because nitrite and ammonia can also form nitrate, compliance with the nitrate standard is achieved through imposition of a Total Inorganic Nitrogen (T.I.N.) limit. T.I.N. effectively measures nitrate and its precursors including nitrite and ammonia.

To determine the background concentration for Total Inorganic Nitrogen for use in the mass balance equation, same day samples of the ambient data for ammonia, nitrite and nitrate (or nitrite + nitrate) were added together to calculate the T.I.N. The 85^{th} percentile of this summed data as shown in Table A-7, was calculated and used as the ambient water quality for T.I.N.

Table A-8a

Chronic WQBELs for Montrose WWTF

Parameter	Q_1 *(cfs)*	Q_2 *(cfs)*	Q_3 *(cfs)*	M_1	M_3	M_2	*Notes*
Temp MWAT (°C) March-Nov	34	6.7	40.7	NA	28	***27.5***	
Temp MWAT (°C) Dec-Feb	34	6.7	40.7	NA	14	***13.8***	
E. coli (#/100 ml)	34	7.8	41.8	15	126	***610***	
TRC (mg/l)	34	7.8	41.8	0	0.011	***0.059***	
As, TR (µg/l)	34	6.7	40.7	0	0.02	***10***	
Cd, Dis (µg/l)	34	6.7	40.7	0	1.2	***7.3***	
Cr+3, Dis (µg/l)	34	6.7	40.7	0	223	***1355***	
Cr+6, Dis (µg/l)	34	6.7	40.7	0	11	***67***	
Cu, Dis (µg/l)	34	6.7	40.7	0	28	***170***	
Fe, Dis (µg/l)	34	6.7	40.7	16	300	***1741***	
Fe, TR (µg/l)	34	6.7	40.7	190	1000	***5110***	
Pb, Dis (µg/l)	34	6.7	40.7	0	10	***61***	
Mn, Dis (µg/l)	34	6.7	40.7	23	50	***187***	
Mo, TR (µg/l)	34	6.7	40.7	0	160	***972***	
Hg, Tot (µg/l)	34	6.7	40.7	0	0.01	***0.061***	
Ni, Dis (µg/l)	34	6.7	40.7	0	162	***984***	
Se, Dis (µg/l)	34	7.8	41.8	2.5	4.6	***14***	1
Ag, Dis (µg/l)	34	6.7	40.7	0	3.2	***19***	
Zn, Dis (µg/l)	34	6.7	40.7	5.2	411	***2470***	
Nonylphenol (µg/l)	34	6.7	40.7	0	6.6	***40***	
Chloride (mg/l)	34	6.7	40.7	0	250	***1519***	
Sulfate (mg/l)	34	6.7	40.7	0	250	***1519***	

Note 1: The TMDL also applies for chronic selenium.

Table A-8b

Acute WQBELs for Montrose WWTF

Parameter	Q_1 (cfs)	Q_2 (cfs)	Q_3 (cfs)	M_1	M_3	M_2	*Notes*
Temp Daily Max (°C) March-Nov	30	6.7	36.7	NA	28.6	***28.6***	
Temp Daily Max (°C) Dec-Feb	30	6.7	36.7	NA	14.3	***14.3***	
TRC (mg/l)	30	7.8	37.8	0	0.019	***0.092***	
Nitrate/TIN as N (mg/l)	30	7.8	37.8	0.58	10	***46***	
Nitrite as N (mg/l)	30	7.8	37.8	0	0.5	***2.4***	
As, Dis (µg/l)	30	6.7	36.7	0	340	***1862***	
Cd, Dis (µg/l)	30	6.7	36.7	0	8.8	***48***	
Cr+3, TR (µg/l)	30	6.7	36.7	0	50	***274***	
Cr+6, Dis (µg/l)	30	6.7	36.7	0	16	***88***	
Cu, Dis (µg/l)	30	6.7	36.7	0	48	***263***	
CN, Free (µg/l)	30	6.7	36.7	0	5	***27***	
Pb, Dis (µg/l)	30	6.7	36.7	0	269	***1473***	
Mn, Dis (µg/l)	30	6.7	36.7	23	4670	***25477***	
Ni, Dis (µg/l)	30	6.7	36.7	0	1458	***7986***	
Se, Dis (µg/l)	30	6.7	36.7	2.5	18.4	***90***	
Ag, Dis (µg/l)	30	6.7	36.7	0	20	***110***	
Zn, Dis (µg/l)	30	6.7	36.7	5.2	543	***2951***	
Nonylphenol (µg/l)	30	6.7	36.7	0	28	***153***	

Table A-8c

Chronic WQBELs for West Montrose SD WWTF

Parameter	Q_1 (cfs)	Q_2 (cfs)	Q_3 (cfs)	M_1	M_3	M_2	*Notes*
E. coli (#/100 ml)	34	7.8	41.8	15	126	***610***	
TRC (mg/l)	34	7.8	41.8	0	0.011	***0.059***	
Se, Dis (µg/l)	34	7.8	41.8	2.5	4.6	***14***	1
Note 1: The TMDL also applies for chronic selenium.							

Table A-8d

Acute WQBELs for West Montrose SD WWTF

Parameter	Q_1 (cfs)	Q_2 (cfs)	Q_3 (cfs)	M_1	M_3	M_2	*Notes*
TRC (mg/l)	30	7.8	37.8	0	0.019	***0.092***	
Nitrate/TIN as N (mg/l)	30	7.8	37.8	0.58	10	***46***	
Nitrite as N (mg/l)	30	7.8	37.8	0	0.5	***2.4***	
Se, Dis (µg/l)	30	7.8	37.8	2.5	18.4	***80***	

Ammonia: The Ammonia Toxicity Model (AMMTOX) is a software program designed to project the downstream effects of ammonia and the ammonia assimilative capacities available to each discharger based on upstream water quality and effluent discharges. To develop data for the AMMTOX model, an in-stream water quality study should be conducted of the upstream receiving water conditions, particularly the pH and corresponding temperature, over a period of at least one year.

Temperature and corresponding pH data sets reflecting upstream ambient receiving water conditions were available for Uncompahgre River based on data set established in the 2009 WQA, since there are no new data available. The combined data, reflecting a period of record from February 1997 through June 2005, were used to establish the setpoint and average headwater conditions in the AMMTOX model. Effluent pH and temperature data were also available from the Montrose WWTF and the West Montrose SD WWTF and were used to establish the average facility contributions in the AMMTOX model.

Upstream ammonia data for each month were not adequate to represent monthly ambient water quality concentrations for the AMMTOX. Thus, the mean total ammonia concentration found in Uncompahgre River as summarized in Table A-7 was used as an applicable upstream ammonia concentration reflective of each month.

The AMMTOX may be calibrated for a number of variables in addition to the data discussed above. The values used for the other variables in the model are listed below:

- Stream velocity = $0.3Q^{0.4d}$
- Default ammonia loss rate = 6/day
- pH amplitude was assumed to be medium
- Default times for pH maximum, temperature maximum, and time of day of occurrence
- pH rebound was set at the default value of 0.2 su per mile
- Temperature rebound was set at the default value of 0.7 degrees C per mile.

The results of the ammonia analyses for the Montrose WWTF are presented in Table A-9a (Montrose WWTF) and Table A-9b (West Montrose SD WWTF).

Table A-9a

AMMTOX Results for Uncompahgre River at the Montrose WWTF

Design of 4.32 MGD (6.7cfs)

Month	*Total Ammonia Chronic (mg/l)*	*Total Ammonia Acute (mg/l)*
January	13	23
February	13	22
March	11	19
April	9	27
May	13	33
June	21	52
July	19	53
August	14	47
September	18	49
October	15	36
November	21	44
December	14	26

The results of this AMMTOX are different from the 2009 AMMTOX, because 4.45 cfs was used as the design flow for the Montrose WWTF instead of 6.7 cfs and the Montrose WWTF was placed 0.8 miles upstream of the West Montrose SD WWTF when it is 0.3 miles downstream of West Montrose. This has been corrected in this WQA.

Table A-9b

AMMTOX Results for Uncompahgre River at the West Montrose SD WWTF

Design of 0.7 MGD (1.1cfs)

Month	*Total Ammonia Chronic (mg/l)*	*Total Ammonia Acute (mg/l)*
January	18	24
February	18	30
March	13	23
April	13	31
May	13	41
June	21	54
July	19	53
August	18	46
September	22	53
October	21	37
November	22	45
December	17	27

The results of this AMMTOX are different from the 2009 AMMTOX, because 4.45 cfs was used as the design flow for the Montrose WWTF instead of 6.7 cfs and the Montrose WWTF was placed 0.8 miles upstream of the West Montrose SD WWTF when it is 0.3 miles downstream of West Montrose. This has been corrected in this WQA.

VII. Antidegradation Evaluation

As set out in *The Basic Standards and Methodologies for Surface Water*, Section 31.8(2)(b), an antidegradation analysis is required except in cases where the receiving water is designated as "Use Protected." Note that "Use Protected" waters are waters "that the Commission has determined do not warrant the special protection provided by the outstanding waters designation or the antidegradation review process" as set out in Section 31.8(2)(b). The antidegradation section of the regulation became effective in December 2000, and therefore antidegradation considerations are applicable to this WQA analysis.

According to the *Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins*, stream segment COGUUN04a is Undesignated. Thus, an antidegradation review is required for this segment if new or increased impacts are found to occur.

Introduction to the Antidegradation Process

The antidegradation process conducted as part of this water quality assessment is designed to determine if an antidegradation review is necessary and if necessary, to complete the required calculations to determine the limits that can be selected as the antidegradation-based effluent limit (ADBEL), absent further analyses that must be conducted by the facility.

As outlined in the *Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance* (AD Guidance), the first consideration of an antidegradation evaluation is to determine if new or increased impacts are expected to occur. This is determined by a comparison of the newly calculated WQBELs verses the existing permit limitations in place as of September 30, 2000, and is described in more detail in the analysis. Note that the AD Guidance refers to the permit limitations as of September 30, 2000 as the existing limits.

If a new or increased impact is found to occur, then the next step of the antidegradation process is to go through the significance determination tests. These tests include: 1) bioaccumulative toxic pollutant test; 2) temporary impacts test; 3) dilution test (100:1 dilution at low flow) and; 4) a concentration test.

As the determination of new or increased impacts, and the bioaccumulative and concentration significance determination tests require more extensive calculations, the Division will begin the antidegradation evaluation with the dilution and temporary impact significance determination tests. These two significance tests may exempt a facility from further AD review without the additional calculations.

Note that the antidegradation requirements outlined in *The Basic Standards and Methodologies for Surface Water* specify that chronic numeric standards should be used in the antidegradation review; however, where there is only an acute standard, the acute standard should be used. The appropriate standards are used in the following antidegradation analysis.

Significance Tests for Temporary Impacts and Dilution

This is not a temporary discharge and therefore exclusion based on a temporary discharge cannot be granted and the AD evaluation must continue.

The ratio of the chronic (30E3) low flow to the design flow of the Montrose WWTF is 5:1, and is less than the 100:1 significance criteria. The ratio of the chronic (30E3) low flow to the design flow of the West Montrose SD WWTF is 31:1, and is less than the 100:1 significance criteria. Therefore the facilities are not exempt from an AD evaluation based on the dilution significance determination test, and the AD evaluation must continue.

For the determination of a new or increased impact and for the remaining significance determination tests, additional calculations are necessary. Therefore, at this point in the antidegradation evaluation, the Division will go back to the new or increased impacts test. If there is a new or increased impact, the last two significance tests will be evaluated.

New or Increased Impact and Non Impact Limitations (NILs)

To determine if there is a new or increased impact to the receiving water, a comparison of the new WQBEL concentrations and loadings verses the concentrations and loadings as of September 30, 2000, needs to occur. If either the new concentration or loading is greater than the September 2000 concentration or loading, then a new or increased impact is determined. If this is a new facility

(commencement of discharge after September 30, 2000) it is automatically considered a new or increased impact.

Note that the AD Guidance document includes a step in the New or Increased Impact Test that calculates the Non-Impact Limit (NIL). The permittee may choose to retain a NIL if certain conditions are met, and therefore the AD evaluation for that parameter would be complete. As the NIL is typically greater than the ADBAC, and is therefore the chosen limit, the Division will typically conclude the AD evaluation after determining the NIL. Where the NILs are very stringent, or upon request of a permittee, the Division will calculate both the NIL and the AD limitation so that the limitations can be compared and the permittee can determine which of the two limits they would prefer, one which does not allow any increased impact (NIL), or the other which allows an insignificant impact (AD limit).

The non impact limit (NIL) is defined as the limit which results in no increased water quality impact (no increase in load or limit over the September 2000 load or limit). The NIL is calculated as the September 2000 loading, divided by the new design flow, and divided by a conversion factor of 8.34. If there is no change in design flow, then the NIL is equal to the September 2000 permit limitation.

If the facility was in place, but did not have a limitation for a particular parameter in the September 2000 permit, the Division may substitute an implicit limitation. Consistent with the First Update to the AD Guidance of April 2002, an implicit limit is determined based on the approach that specifies that the implicit limit is the maximum concentration of the effluent from October 1998 to September 2000, if such data is available. If this data is unavailable, the Division may substitute more recent representative data, if appropriate, on a case by case basis. Note that if there is a change in design flow, the implicit limit/loading is subject to recalculation based on the new design flow. For parameters that are undisclosed by the permittee, and unknown to the Division to be present, an implicit limitation may not be recognized.

Both facilities were in place as dischargers prior to September 30, 2000, and therefore the new or increased impacts test must be conducted. As the design flows of these facilities have changed, the equations for the NIL calculations are shown below.

Montrose WWTF

For total residual chlorine, *E. coli* (September 2000 fecal coliform limit), total ammonia and total mercury, the limitations as of September 2000 were used in the evaluation of new or increased impacts. In accordance with the Division's practice regarding *E. coli*, an implicit limit for *E. coli* is determined as 0.32 times the permit limit for fecal coliform.

For dissolved copper, total recoverable iron and dissolved selenium, data prior to 2000 were not available for the Montrose WWTF. Therefore data from August 2009 through September 2012 were determined to be adequate and were used to determine the implicit limitations.

For nitrate, nitrite, T.I.N., total recoverable arsenic, dissolved arsenic, dissolved cadmium, total recoverable trivalent chromium, dissolved trivalent chromium, dissolved hexavalent chromium, dissolved iron, dissolved lead, dissolved manganese, dissolved nickel, dissolved silver, dissolved

zinc and cyanide, chloride and sulfate there are no effluent data available and therefore, the Division will include monitoring requirements in the permit so that data can be collected in order to make such a determination of an implicit limit.

West Montrose SD WWTF

For total residual chlorine, *E. coli* (September 2000 fecal coliform limit), and total ammonia the limitations as of September 2000 were used in the evaluation of new or increased impacts. In accordance with the Division's practice regarding *E. coli*, an implicit limit for *E. coli* is determined as 0.32 times the permit limit for fecal coliform.

For nitrate, nitrite, T.I.N., there are no effluent data available and therefore, the Division will include monitoring requirements in the permit so that data can be collected in order to make such a determination of an implicit limit.

Calculation of Non-Impact Limitations

For the Montrose WWTF the design flow as of September 30, 2000 was 2.88 MGD. The new design flow of this facility is 4.32 MGD. To determine if new or increased impacts are to occur, the September 2000 permit concentrations need to be adjusted for this new design flow. The equations are shown below.

For the West Montrose SD WWTF the design flow of this facility as of September 30, 2000 was 0.35 MGD. The new design flow of this facility is 0.7 MGD. To determine if new or increased impacts are to occur, the September 2000 permit concentrations need to be adjusted for this new design flow. The equations are shown below.

$$\textit{September 2000 permit load} = M_{permitted} \times Q_{permitted} \times 8.34$$

$$\textit{Non Impact Limit (NIL)} = \textit{September 2000 permitted load} \div \textit{New Design Flow} \div 8.34$$

Where,

$M_{permitted}$ = September 2000 permit limit or implicit limit **(mg/l)**
$Q_{permitted}$ = September 2000 design flow **(mgd)**
Q_2 = new or current design flow **(mgd)**
8.34 = Unit conversion factor

Tables A-10a (Montrose WWTF) and A-10b (West Montrose SD WWTF) show the results of these calculations and the determination of a new or increased impact.

Table A-10a

Determination of New or Increased Impacts for Montrose WWTF

Pollutant	*Sept 2000 Permit Limit*	*Sept 2000 Permit Load (lbs/day)*	*NIL*	*New WQBEL*	*New WQBEL Load (lbs/day)*	*New or Increased Impact*
E. coli (#/100 ml)	1920	46117	1280	610	21978	No
TRC (mg/l)	0.04	0.96	0.027	0.059	2.1	Yes
Nitrate/TIN as N (mg/l)	NA	NA	NA	46	1657	Yes
Nitrite as N (mg/l)	NA	NA	NA	0.24	8.6	Yes
NH_3, Tot (mg/l) Jan	8	192	5.3	13	468	Yes
NH_3, Tot (mg/l) Feb	8	192	5.3	13	468	Yes
NH_3, Tot (mg/l) Mar	8	192	5.3	11	396	Yes
NH_3, Tot (mg/l) Apr	8	192	5.3	9	324	Yes
NH_3, Tot (mg/l) May	8	192	5.3	13	468	Yes
NH_3, Tot (mg/l) Jun	8	192	5.3	21	757	Yes
NH_3, Tot (mg/l) Jul	8	192	5.3	19	685	Yes
NH_3, Tot (mg/l) Aug	8	192	5.3	14	504	Yes
NH_3, Tot (mg/l) Sep	8	192	5.3	18	649	Yes
NH_3, Tot (mg/l) Oct	8	192	5.3	15	540	Yes
NH_3, Tot (mg/l) Nov	8	192	5.3	21	757	Yes
NH_3, Tot (mg/l) Dec	8	192	5.3	14	504	Yes
As, TR (µg/l)	NA	NA	NA	10	0.36	Yes
As, Dis (µg/l)	NA	NA	NA	1862	67	Yes
Cd, Dis (µg/l)	NA	NA	NA	7.3	0.26	Yes
Cr, TR (µg/l)	NA	NA	NA	274	9.9	Yes
Cr+3, TR (µg/l)	NA	NA	NA	274	9.9	Yes
Cr+3, Dis (µg/l)	NA	NA	NA	1355	49	Yes
Cr+6, Dis (µg/l)	NA	NA	NA	67	2.4	Yes
Cu, Dis (µg/l)	NA	NA	60	170	6.1	Yes
CN, Free (µg/l)	NA	NA	NA	27	0.97	Yes
Fe, Dis (µg/l)	NA	NA	NA	1741	63	Yes
Fe, TR (µg/l)	NA	NA	92	5110	184	Yes
Pb, Dis (µg/l)	NA	NA	NA	61	2.2	Yes
Mn, Dis (µg/l)	NA	NA	NA	187	6.7	Yes
Mo, TR (µg/l)	NA	NA	NA	972	35	Yes
Hg, Tot (µg/l)	0.12	0.003	0.080	0.061	0.002	No
Ni, Dis (µg/l)	NA	NA	NA	984	35	Yes
Se, Dis (µg/l)	NA	NA	22	15	0.54	No
Ag, Dis (µg/l)	NA	NA	NA	19	0.68	Yes
Zn, Dis (µg/l)	NA	NA	NA	2470	89	Yes
Nonylphenol (µg/l)	NA	NA	NA	40	1.4	Yes

Chloride (mg/l)	NA	NA	NA	1519	54728	Yes
Sulfate (mg/l)	NA	NA	NA	1519	54728	Yes

Montrose WWTF

As shown in Table A-10a, there are no new or increased impacts to the receiving stream based on the new WQBELS for *E. coli*, selenium, and mercury. For these parameters the AD evaluation is complete and the WQBELs are the final result of this WQA.

For all the other parameters there are new or increased impacts and in accordance with regulation, the permittee has the option of choosing either the NIL's or ADBAC's. Because the ADBAC's are generally more stringent than NIL's, the Division assumes that the permittee will choose NIL's rather than ADBAC's, and therefore the Division will stop the AD evaluation at this point and assign the NILs to the permit. For those parameters where there is not a NIL (either implicit or explicit) the AD Guidance allows for the collection of data to determine an implicit limitation. Therefore, the permittee will be required to conduct "monitoring only" for those parameters. The permittee may request ADBAC limits. If the permittee does request ADBAC limits, the Division will proceed with the completion of this Antidegradation Analysis.

Table A-10b

Determination of New or Increased Impacts for West Montrose SD WWTF

Pollutant	***Sept 2000 Permit Limit***	***Sept 2000 Permit Load (lbs/day)***	***NIL***	***New WQBEL***	***New WQBEL Load (lbs/day)***	***New or Increased Impact***
E. coli (#/100 ml)	1920	5604	960	610	3561	No
TRC (mg/l)	0.5	1.5	0.25	0.059	0.34	No
Nitrate as N (mg/l)	NA	NA	NA	46	269	Yes
Nitrite as N (mg/l)	NA	NA	NA	2.4	14	Yes
NH_3, Tot (mg/l) Jan	65.4	191	33	18	105	No
NH_3, Tot (mg/l) Feb	51.6	151	26	18	105	No
NH_3, Tot (mg/l) Mar	29.8	87	15	13	76	No
NH_3, Tot (mg/l) Apr	21	61	11	13	76	Yes
NH_3, Tot (mg/l) May	30.2	88	15	13	76	No
NH_3, Tot (mg/l) Jun	103	301	52	21	123	No
NH_3, Tot (mg/l) Jul	90.3	264	45	19	111	No
NH_3, Tot (mg/l) Aug	71.4	208	36	18	105	No
NH_3, Tot (mg/l) Sep	36.1	105	18	22	128	Yes
NH_3, Tot (mg/l) Oct	12.1	35	6.1	21	123	Yes
NH_3, Tot (mg/l) Nov	19.7	58	9.9	22	128	Yes
NH_3, Tot (mg/l) Dec	56.1	164	28	17	99	No

West Montrose SD WWTF

As shown in Table A-10b, there are no new or increased impacts to the receiving stream based on the new WQBELS, *E. coli*, TRC, and ammonia for the months of January, February, March, May, June, July, August and December. Therefore the AD evaluation is complete, and AD limitations are not necessary. The WQBELs are the final result of this WQA for these parameters.

For nitrate, nitrite and ammonia for the months of April through November, there are new or increased impacts and in accordance with regulation, the permittee has the option of choosing either the NIL's or ADBAC's. Because the ADBAC's are generally more stringent than NIL's, the Division assumes that the permittee will choose NIL's rather than ADBAC's, and therefore the Division will stop the AD evaluation at this point and assign the NILs to the permit. For those parameters where there is not a NIL (either implicit or explicit) the AD Guidance allows for the collection of data to determine an implicit limitation. Therefore, the permittee will be required to conduct "monitoring only" for those parameters. The permittee may request ADBAC limits. If the permittee does request ADBAC limits, the Division will proceed with the completion of this Antidegradation Analysis.

Alternatives Analysis

If the permittee does not want to accept an effluent limitation that results in no increased impact (NIL) or in insignificant degradation (ADBAC), the applicant may conduct an alternatives analysis (AA). The AA examines alternatives that may result in no degradation or less degradation, and are economically, environmentally, and technologically reasonable. If the proposed activity is determined to be important economic or social development, a determination shall be made whether the degradation that would result from such regulated activity is necessary to accommodate that development. The result of an AA may be an alternate limitation between the ADBEL and the WQBEL, and therefore the ADBEL would not being applied. This option can be further explored with the Division. See Regulation 31.8 (3)(d), and the Antidegradation Guidance for more information regarding an alternatives analysis.

VIII. Technology Based Limitations

Federal Effluent Limitation Guidelines

The Federal Effluent Limitation Guidelines for domestic wastewater treatment facilities are the secondary treatment standards. These standards have been adopted into, and are applied out of, Regulation 62, the Regulations for Effluent Limitations.

Regulations for Effluent Limitations

Regulation No. 62, the Regulations for Effluent Limitations, includes effluent limitations that apply to all discharges of wastewater to State waters, with the exception of storm water and agricultural return flows. These regulations are applicable to the discharge from both facilities.

Table A-11 contains a summary of the applicable limitations for pollutants of concern at these

facilities.

Table A-11

Regulation 62 Based Limitations

Parameter	*30-Day Average*	*7-Day Average*	*Instantaneous Maximum*
BOD_5	30 mg/l	45 mg/l	NA
BOD_5 Percent Removal	85%	NA	NA
TSS, mechanical plant	30 mg/l	45 mg/l	NA
TSS Percent Removal	85%	NA	NA
Total Residual Chlorine	NA	NA	0.5 mg/l
pH	NA	NA	6.0-9.0 s.u.
Oil and Grease	NA	NA	10 mg/l

IX. References

Regulations:

The Basic Standards and Methodologies for Surface Water, Regulation 31, Colorado Department Public Health and Environment, Water Quality Control Commission, effective January 31, 2013.

Classifications and Numeric Standards for Gunnison and Lower Dolores River Basins, Regulation No. 35, Colorado Department Public Health and Environment, Water Quality Control Commission, effective March 30, 2013

Colorado River Salinity Standards, Regulation 39, CDPHE, WQCC (last update effective 8/30/97)

Regulations for Effluent Limitations, Regulation 62, CDPHE, WQCC, March 30, 2008.

Colorado's Section 303(d) List of Impaired Waters and Monitoring and Evaluation List, Regulation 93, Colorado Department Public Health and Environment, Water Quality Control Commission, effective April 30, 2010.

Policy and Guidance Documents:

Antidegradation Significance Determination for New or Increased Water Quality Impacts, Procedural Guidance, Colorado Department Public Health and Environment, Water Quality Control Division, December 2001.

Memorandum Re: First Update to (Antidegradation) Guidance Version 1.0, Colorado Department Public Health and Environment, Water Quality Control Division, April 23, 2002.

Rationale for Classifications, Standards and Designations of Segments of the Gunnison River, Colorado Department Public Health and Environment, Water Quality Control Division, effective March 30, 2013.

Policy Concerning Escherichia coli versus Fecal Coliform, CDPHE, WQCD, July 20, 2005.

Colorado Mixing Zone Implementation Guidance, Colorado Department Public Health and Environment, Water Quality Control Division, effective April 2002.

Policy for Conducting Assessments for Implementation of Temperature Standards in Discharge Permits, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-23, effective July 3, 2008.

Implementing Narrative Standards in Discharge Permits for the Protection of Irrigated Crops, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-24, effective March 10, 2008.

Policy for Characterizing Ambient Water Quality for Use in Determining Water Quality Standards Based Effluent Limits, Colorado Department Public Health and Environment, Water Quality Control Division Policy Number WQP-19, effective May 2002.

Other:

Total Maximum Daily Load Assessment. Gunnison River and Tributaries, Uncompahgre River and Tributaries. Delta/Mesa/Montrose Counties, Colorado. Colorado Department Public Health and Environment, January 2011.